

## **Lab 4 Worksheet: Dichotomous Keys**

There is a huge diversity of living creatures on the planet, so no one can be an expert on all of them. In addition, different regions have different common names for the same thing, adding to the confusion. In order for scientists to be sure they are all referring to the same thing, they have developed and agreed upon an international classification system for naming organisms.

Getting to the correct name is still no easy feat, so experts have developed identification guides or “**dichotomous keys**” to help non-experts identify the organisms that they see. The word “dichotomous” comes from the Ancient Greek “dikho” meaning to cut in two. In dichotomous keys, you have a series of **couplets**, which are two different possible descriptions of an organism. Your job is to examine your specimen and decide which description fits your specimen best. That description will then lead to the next couplet and choice. These choices will lead you to the next couplet, and the next, until you arrive at a description that names your specimen.

In this lab, you will practice using dichotomous keys, and then create one yourself. (70)

### **A. Using a dichotomous key**

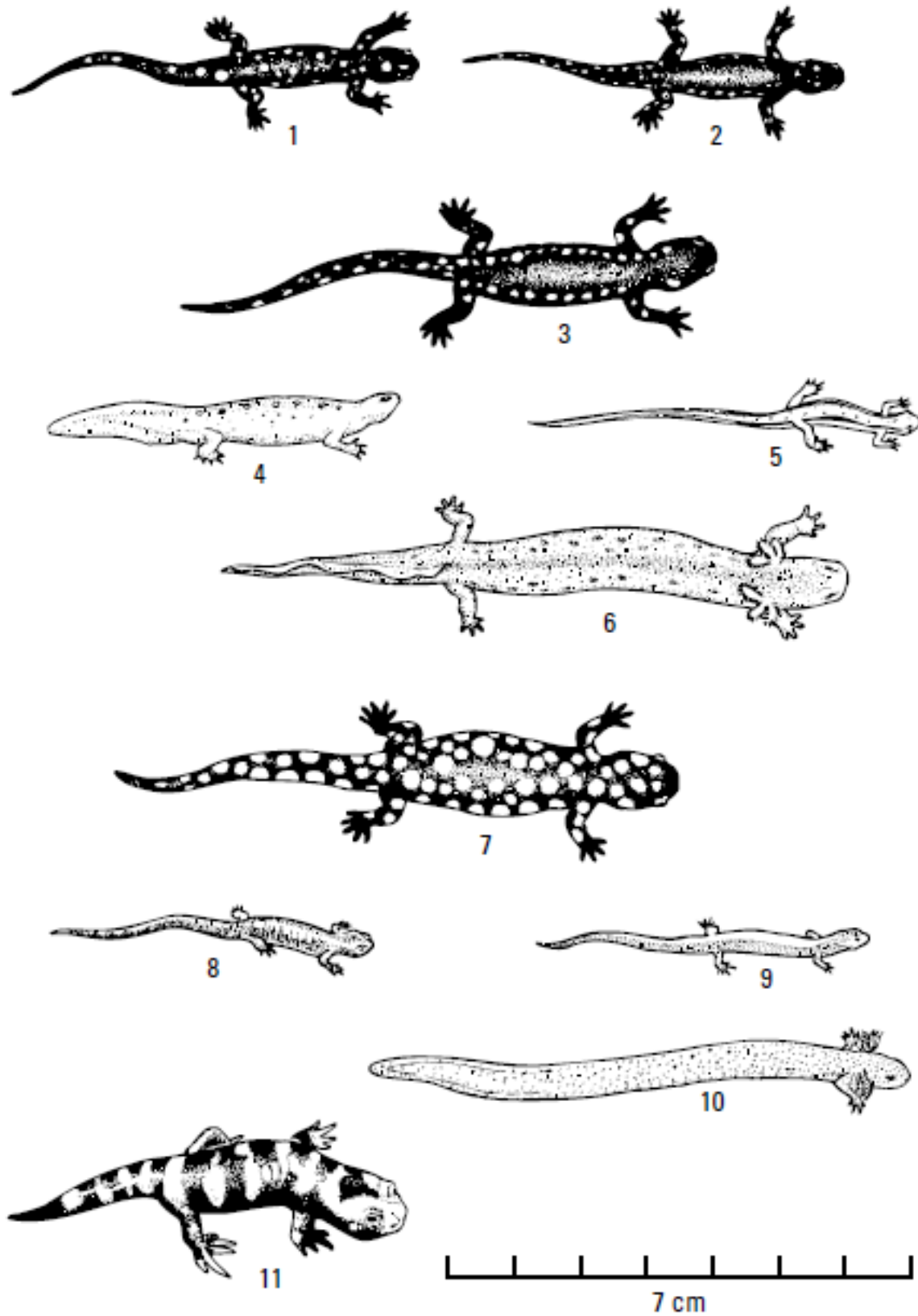
Take a look at the different salamander species in Figure 1 on page 2 and answer the questions below. You will use the key on page 3 to identify each of these specimens.

#### **Questions:**

What are some of the similarities you can see among the salamanders? (3)

What are some of the differences you can see among the salamanders? (3)

If you were to use live organisms rather than diagrams, what other characteristics could you use to identify them? (3)



**Figure 1**

Now, follow these steps to identify your salamanders with the key below.

Step 1: Read couplet 1 – statements 1a and 1b.

Step 2: Examine your specimen and decide which statement best describes it. Follow the direction for that statement to the next couplet.

Step 3: Repeat this procedure until the direction for a statement leads you to a name. Record the common name and scientific name in Table 1 on page 4.

Couplet	Statement	Scientific Name	Common name
1	<b>a Hind limbs absent</b>	<i>Siren intermedia</i>	siren
	<b>b Hind limbs present</b>	Go to 2	
2	<b>a External gills (extend out near where ears would be) present in adults</b>	<i>Necturus maculosus</i>	mud puppy
	<b>b External gills absent in adults</b>	Go to 3	
3	<b>a Large size (over 7 cm long in Figure 1)</b>	Go to 4	
	<b>b Small size (under 7 cm long in Figure 1)</b>	Go to 5	
4	<b>a Body background black, large white spots variable (different) in size completely covering body and tail</b>	<i>Ambystoma tigrinum</i>	tiger salamander
	<b>b Body background black, small round white spots in a row along each side from eye to tip of tail</b>	<i>Ambystoma maculatum</i>	spotted salamander
5	<b>a Body background black with white spots</b>	Go to 6	
	<b>b Body background light color with dark spots and/or lines on body</b>	Go to 7	
6	<b>a Small white spots on black background in a row along each side from head to tip of tail</b>	<i>Ambystoma jeffersonianum</i>	Jefferson salamander
	<b>b Small white spots scattered throughout a black background from head to tip of tail</b>	<i>Plethodon glutinosus</i>	slimy salamander
7	<b>a Large irregular white spots on a black background extending from head to tip of tail</b>	<i>Ambystoma opacum</i>	marbled salamander
	<b>b No large irregular black spots on a light background</b>	Go to 8	
8	<b>a Round spots scattered along back and sides of body, tail flattened like a tadpole</b>	<i>Triturus viridescens</i>	newt
	<b>b Without round spots and tail not flattened like a tadpole</b>	Go to 9	
9	<b>a Two dark lines bordering a broad light middorsal (mid back) stripe with a narrow dark line extending from the head onto the tail</b>	<i>Eurycea bislineata</i>	two-lined salamander
	<b>b Without two dark lines running the length of the body</b>	Go to 10	
10	<b>a A light stripe running the length of the body and bordered by dark pigment extending downward on the sides</b>	<i>Plethodon cinereus</i>	red-backed salamander
	<b>b A light stripe extending the length of the body without dark pigment on the sides</b>	<i>Hemidactylium scutatum</i>	four-toed salamander

Table 1. Salamander Identification (11)

Specimen	Scientific Name	Common name
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		

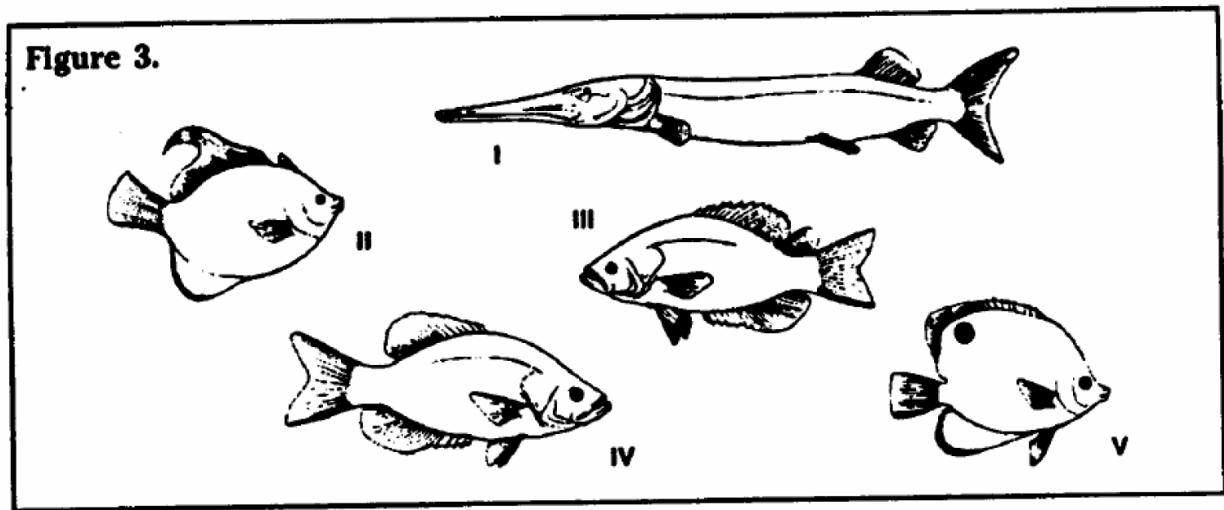
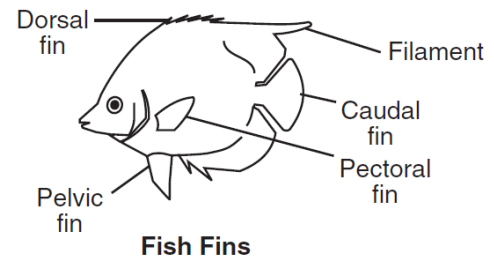
What are four of the characteristics that you used to identify the salamanders? Were they some of the similarities or differences that you identified? (5)

What might be a good strategy to begin creating your own dichotomous key? (5)

### B. Creating a dichotomous key as a class

We will all work together to create a dichotomous key of the fish species in Figure 3 below. (10)

Remember that each couplet has only two options! The descriptions in each couplet should be about the same characteristics. Instead of names, we will use the roman numerals for each fish (I, II, III, IV, V).



Dichotomous Key to Fishes:

Do you think that any of these fish species may be closely related enough to be in the same genus? If so, which ones and why? If not, why not? (5)

**C. Create your own dichotomous key**

In this activity, you are going to look at shells from marine snails and bivalves and develop a dichotomous key to identify them. Use the photos found in the accompanying “Mollusc Specimens 1-8” document. (25)